EXAMINATION OF THE RELATIONSHIP BETWEEN ROUTINE SUBSTANCE USE IN HIGH SCHOOL STUDENTS AND COLLEGE ATTENDANCE

A THESIS

SUBMITTED TO THE GRADUATE SCHOOL

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS

FOR THE DEGREE

MASTER OF ARTS

IN STUDENT AFFAIRS ADMINISTRATION IN HIGHER EDUCATION

BY

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BALL STATE UNIVERSITY

MUNCIE, INDIANA

JULY 2018

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MUNCIE, INDIANA

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ABSTRACT

THESIS TITLE: Examination of the Relationship Between Routine Substance Use in High School Students and College Attendance

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The purpose of this study was to determine if there was a statistically significant relationship between routine substance use in high school, college attendance, and type of college attended. Archival data of 1,988 participants was used from the Partnerships in Prevention Science Institute at Iowa State University. A cross-tabulation with the Chi square and Cochran's and Mantel-Haenszel statistics was the type of analysis utilized.

Results from this study found there are differences in college attendance by gender and geographic location. Students who did not use substances in high school attended college at a higher rate than their peers that routinely used substances. Students who did not use substances in high school attended a four-year college or university at a higher rate than students that routinely used substances. Students who routinely used substances attended a trade school or community college at a higher rate than students that did not use substances.

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I chose to write a thesis to challenge myself and to learn something new, and my experience has done just that. Writing a thesis in the three semester track program has not been an easy feat. I have had many people supporting and encouraging me along the way this past year. It took a lot of collaboration and guidance to do something that I had never done before and there are many people that I would like to give my thanks and appreciation to.

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CHAPTER ONE: INTRODUCTION

The United States has a serious problem with substance abuse. Misuse of alcohol, drugs, and other related substance use disorders effect millions of Americans and poses large costs to society (U.S. Department of Health and Human Services, 2016). Abusing and being addicted to nicotine, alcohol, illicit drugs, and prescription drugs cost Americans more than $700 billion a year in health care, lost productivity, and crime (National Institute on Drug Abuse, 2014). Many people begin taking substances to feel good or better, do better and improve performance, explore with curiosity, and mimic peers actions. Using substances is the leading cause of preventable illness and death (Miller et al., 2015). Every year more than 90,000 Americans deaths are linked to alcohol, illicit drugs, and prescription drugs and 480,000 deaths are linked to tobacco (National Institute on Drug Abuse, 2014). While the consequences for the individual misusing substances are very serious, they can also harm others around them through prenatal drug exposure on infants and children, secondhand smoke, and increased spread of infectious diseases.

Young adulthood is a time of increased substance use (Kirst, Mecredy, Borland, & Chaiton, 2014; Schulenberg & Maggs, 2002). Some of the predictors of substance use and abuse in adolescents and young adults found include low socio-economic status, peer influence, social support, parental substance use, sensation seeking, perceived risks, mental health, stress, school environment, attitudes, self-esteem, peer delinquency, and street involvement (Kirst et al., 2014). Students who live in two-parent families, have parents who have completed more than a high school education, and who have goals to go to college themselves, are less likely to use substances than their peers who grew up without these advantages (Bachman et al., 2007; Schulenberg & Maggs, 2002). The National Institute on Drug Use (2017) found that 2.9% of

tenth graders and 6.0% of twelfth graders reported using marijuana daily. They also found that 19.7% of tenth graders and 33.2% of twelfth graders reported using alcohol in the past month, and 2.2% of tenth graders and 4.2% of twelfth graders reported using cigarettes daily. Substance use in young adulthood can have a large impact on a person's future. Research has shown that the earlier a person begins using substances, the more likely he or she is to develop a serious problem or addiction (National Institute on Drug Abuse, 2014). Substance use in adolescence and young adulthood has been associated with poor academic performance, teen pregnancy, sexually transmitted diseases, job instability, and several types of crime (Barnett et al., 2013).

Currently, little research exists on the relationship between high school substance use and college attendance. Only one study has been identified that was conducted by Patrick, Schulenberg, and O'Malley (2016) who looked at predictors of college attendance and found that high school seniors who smoked cigarettes or used illegal drugs (not including marijuana) in the past 30 days had significantly lower odds of attending college; however, there was no significant differences for binge drinking (consuming five or more drinks in a row) or marijuana use. The limitations of Patrick et al.'s study have been identified and addressed in this study through collecting data multiple years in high school (not just their senior year) and conducting follow-up surveys in a different manner. The goal of this study is to fill the gaps in the research in the area of high school substance use and college attendance.

Purpose of the Study

The purpose of this study was to determine if there was a statistically significant relationship between routine substance use (including at least one of the following: cigarettes, alcohol, marijuana, inhalants, and methamphetamine) in high school, college attendance, and type of college attended (trade school/community college or four-year college/university). In

this study routine substance use is defined as: smoking a few times or more in the past month; drinking beer, wine, wine coolers, or other liquor a few times or more in the past month; becoming drunk after drinking wine, wine coolers, or other liquor one or more times in the past month; smoking marijuana a few times or more in the past month; using inhalants three or more times in the past year; and using methamphetamine one or more times in the past year.

Research Questions

The following research questions were asked in this study:

1. Does the influence of routine substance use (including at least one of the following: cigarettes, alcohol, marijuana, inhalants, and methamphetamine) in high school students on college attendance vary by factors including gender and geographic location?
2. Are there statistically significant relationships in college attendance among students who engaged in routine substance use (including at least one of the following: cigarettes, alcohol, marijuana, inhalants, and methamphetamine) in high school compared to students who did not engage in routine substance use in high school?
3. Are there statistically significant relationships in the type of college attended (i.e., trade school/community college or four-year college/university) among students who engaged in routine substance use (including at least one of the following: cigarettes, alcohol, marijuana, inhalants, and methamphetamine) in high school compared to students who did not engage in routine substance use in high school?

Hypotheses

The following hypotheses were tested in this study:

1. Females will have a higher rate of college attendance than males. Students who did not engage in routine substance use (including at least one of the following: cigarettes, alcohol, marijuana, inhalants, and methamphetamine) in high school will have a higher rate of college attendance than students that did engage in routine substance use in high school. There will not be a difference in college attendance in students based upon geographic location.
2. College attendance rates will be significantly higher for students who did not engage in routine substance use (including at least one of the following: cigarettes, alcohol, marijuana, inhalants, and methamphetamine) in high school.
2. Attendance rates at a four-year college or university will be significantly higher for students who did not engage in routine substance use (including at least one of the following: cigarettes, alcohol, marijuana, inhalants, and methamphetamine) in high school compared to a trade school or community college. Attendance rates at a trade school or community college will be higher for students who did engage in routine substance use in high school compared to a four-year college or university.

Significance of the Study

Making the decision to attend college is an impactful life choice for high school students. While there have been many studies on the negative effects of substance use, few studies have evaluated the impact of high school students' routine substance use (including cigarettes, alcohol, marijuana, inhalants, and meth) has on their choice to attend college. This focus of this study is on understanding the relationship between routine substance use in high school, the decision to attend college, and the choice of institution type. Braxton (2000) identified a student's background (including his or her family experience, cultural factors, socioeconomic

status, ability, and level of parental encouragement) as a key component of his model of college choice and persistence. Thus, whether or not a student has used substances will contribute to their background and may in turn contribute to their choice to attend college. Understanding the relationship between routine substance use in high school students and college attendance will help educators better support high school and college students in the future.

Results of this study may emphasize the importance of substance use prevention and intervention in adolescents. This study may also provide adequate information to better inform high school educators so they can target individuals that may require more assistance when making the decision to attend college. Lastly, this study may make postsecondary admissions representatives more knowledgeable in recruiting students that have used substances and enable a better transition to college for them.

Definition of Terms

The following terms are defined for this study.

High school – An education level that includes ninth through twelfth grades.

College attendance – The action taken when a high school student chooses to enroll in college classes at an identified institution after receiving a high school diploma.

Trade school – An educational institution where there is a high concentration of degrees in trades.

Community college – A two-year educational institution students where the highest level of degree awarded is an associate's degree.

Four-year college or university – An educational institution where bachelor's degrees are awarded.

Routine substance use – Defined by specified frequencies of the drugs listed below.

Cigarettes – Smoked a few times or more in the past month.

Beer, wine, wine coolers, or other liquor – Drank a few times or more in the past month.

Been drunk – Became drunk after drinking wine, wine coolers, or other liquor one or more times in the past month.

Marijuana (pot, reefer, weed, blunts) – Smoked a few times or more in the past month.

Inhalants – Sniffed glue, paint, gas, or inhaled other things to get high three or more times in the past year.

Methamphetamine (meth) – Used one or more times in the past year.

Summary and Organization of the Study

This study aims to examine if there is a relationship between routine substance use in high school, college attendance, and type of college attendance. Factors including gender and geographic location were also assessed. The results of this study will better prepare educators to support high school and college students in the future. This study is presented in a five chapter format. This chapter provides an introduction and the significance of the research. Chapter two provides a literature review that focuses on theoretical constructs, college attendance, and substance use. Methodology utilized in the study is included in chapter three. The findings of the study are reported in chapter four. Chapter five contains a discussion of the results, limitations of the study, and recommendations for future research. References and an appendix can be found after chapter five.

CHAPTER TWO: LITERATURE REVIEW

Summary of the Study

This study is focused on the relationship between high school student substance use, college attendance, and the type of college attended. Understanding the relationship between substance use in high school students and their attendance in college will help students and educators in multiple areas. First, it will emphasize the importance of substance use prevention and intervention in adolescents. Second, high school educators will be able to help target individuals that may require more assistance when making the college decision. Third, postsecondary admissions representatives will be able to be more knowledgeable in recruiting students that have used substances and better transition them to college. This research is presented in a five-chapter format. Chapter two reviews the literature.

The review of literature provided in this chapter is aimed to help the reader understand the process students go through when making their college decision and the options they have available to them. It also provides an understanding of what leads to substance use in adolescents and young adults as well as what substance use may look like in high school and college students. Furthermore, it examines the relationship between substance use in high school and college attendance.

Theoretical Framework

The decision for students to go to college and then stay at that institution is a complex process with many contributing factors. Tinto (1993) developed a model of institutional departure that includes several factors that he reported impact a student's continued enrolment decision. His model begins by addressing the college choice process with pre-entry attributes. This could include students' family background, skills, abilities, as well as schooling all before

entering college. For example, parental encouragement for a student to attend college has been shown to be a significant predictor of graduation from an institution after enrollment (Braxton, 2000). The next factor is students' goals and commitments ranging from their intentions, goals, institutional commitment, and external commitments (Tinto, 1993). Institutional commitment is the commitment one has to the institution in which they will enroll. The degree of commitment can influence how one may work toward one's goals at the institution. Students' expectations of themselves can also have a powerful effect on their performance and success (Tinto, 2012).

Braxton (2000) assessed Tinto's theory and went on to develop key elements for a behavioral student-centered model of college choice and persistence. The key elements include background, school experiences, intentions and preparations, college entry, and persistence and dropout (in that order). The elements in this model can both prepare and hinder students for their plans to attend college and to be successful in completing college. The theoretical framework for this study is Braxton's (2000) model of college student choice and persistence.

Substance Use

Misuse of alcohol, drugs, and other related substance use disorders affect millions of Americans and pose large costs to society (U.S. Department of Health and Human Services, 2016). Among adolescents in the United States, substance use is the leading cause of morbidity and mortality (Barnett et al., 2013). Specifically, the leading cause of preventable illness and death is tobacco use (Miller et al., 2015). Alcohol is the most commonly-abused substance among both American youth and adults (Patrick & Schulenberg, 2013).

Previous research and literature has found that young adulthood is a time of increased substance use (Kirst, Mecredy, Borland, & Chaiton, 2014; Schulenberg & Maggs, 2002). Johnston, O'Malley, Bachman, and Schulenberg (2011) found that in 2010, 36% of eighth

graders reported having tried alcohol (more than just a few sips). They found that 20% reported trying cigarettes and 15% of the males reported to trying smokeless tobacco. Lastly, 17% of them had tried marijuana. Regarding high school students, Levy (2014) found that almost half of ninth though twelfth graders reported trying cigarettes with one-quarter of them trying tobacco in any form.

Preventing opportunities for young people to use alcohol, tobacco, and other drugs may delay the start of substance use in them as well as prevent later problems caused by substance use (Milam, Johnson, Furr-Holden, & Bradshaw, 2016). Substance use has been associated with poor academic performance, teen pregnancy, sexually transmitted diseases, job instability, and crime (e.g., violence, stealing, vandalism, and driving under the influence; Barnett et al., 2013). By understanding how substance use fits into young people's lives, there can be a stronger foundation for considering cause and influencing positive change (Schulenberg & Maggs, 2002).

Predictors of Use

Cross-sectional research has identified many predictors of substance use and abuse in adolescents and young adults. Some of the predictors found include low socio-economic status, peer influence, social support, parental substance use, sensation seeking, perceived risks, mental health, stress, school environment, attitudes, self-esteem, peer delinquency, and street involvement (Kirst et al., 2014). Young people are also more likely to use substances if they demonstrate behavioral problems and educational difficulties by the eighth grade (Bachman et al., 2007). Students who live in two-parent families, have parents who have completed more than a high school education, and who have goals to go to college themselves, are less likely to use substances than their peers who grew up without these advantages (Bachman et al., 2007; Schulenberg & Maggs, 2002).

Barnett et al. (2013) focused on understanding the factors that enable some youth to resist, avoid, or delay substance use compared to their peers. One of the factors is future time perspective (FTP) which is a person's ability or inclination to focus his or her attention to the future. Barnett et al. found an increased FTP to be protective against substance use for all substances except alcohol.

High School Students

Substance use typically starts during adolescence and young adulthood (Patrick & Schulenberg, 2013). Many teens have easy access to alcohol (Bachman et al., 2007), obtaining it from peer sources as well as some parents (Milam et al., 2016). The National Institute on Drug Use (2017) found that 19.7% of tenth graders and 33.2% of twelfth graders reported using alcohol in the past month. They also found that 2.9% of tenth graders and 6.0% of twelfth graders reported using marijuana daily, and 2.2% of tenth graders and 4.2% of twelfth graders reported using cigarettes daily.

Community and school contexts may play a role in increasing risk for substance use (Milam et al., 2016). Chambliss (2003) found that students with an extraverted personality may have increased access to substances because they prefer to be in social situations, which is where substances are often found in high school and college. There are consequences to teenagers' early use of substances including educational failure either through brain damage or indirectly through lack of motivation, hospitalization, homelessness, or incarceration (Bachman et al., 2007).

College Students

The transition from adolescence to young adulthood is a time of many personal and social role changes. Students may be leaving home, pursuing higher education, starting employment,

engaging in new relationships, and gaining a greater independence and more responsibility (Kirst et al., 2014; Newcomb & Bentler, 1988; Patrick & Schulenberg, 2013; Schulenberg & Maggs, 2002;). Kirst et al. (2014) found that substance use (including tobacco, alcohol, cannabis, and other illicit drugs) in young adults increases as they transition away from high school whether to the workforce or postsecondary education. During this transition they found common predictors of substance use including if they had used substances in high school and peer influence. They also found predictors of substance use in postsecondary education include previous substance use, peer influence, mental health, and psychological factors.

When students arrive on campus, many times the college culture encourages substance use, with a particular emphasis on alcohol (Bachman et al., 2007; Low, 2011). Binge drinking is a serious issue among postsecondary students (Kirst et al., 2014). There are differences in alcohol consumption among genders: men consistently use alcohol at higher rates than women (Patrick & Schulenberg, 2013). Low (2011) found that 63.9% of students entering college reported consuming alcohol. Additionally 8.7% reported smoking marijuana on a weekly basis, and college students have smoking rates between 17-26%. Community college students have an even higher risk of smoking (Miller et al., 2015).

College Attendance

The choice of going to college is one of the first major noncompulsory decisions made by adolescents in America and is an important part of their transition from childhood to adulthood (Hossler, Schmit, & Vesper, 1999). Students' decisions regarding college have a lasting impact on their lives. The investment in higher education has been found to payoff for both average and marginal college students (Oreopoulos & Petronijevic, 2013). Going to college can lead to higher salaries, career mobility, and a higher quality of life (Hossler et al., 1999; Tinto, 2012).

As the number of jobs for those without a college diploma shrinks, it is becoming more important now to get a college education (Fireside, 2009). Students' educational goals, attitudes towards college, and their reasons for attending college can vary widely (Hood, 1968).

Types of Institutions

Students that chose to go to college have a wide range of choice when it comes to size and type of institutions (Hood, 1968). According to Carnegie Foundation for the Advancement of Teaching (2017), there are seven basic classifications for institutions of higher education. First, there are associate's colleges where the highest degree awarded is an associate's degree. Second, there are baccalaureate/associate's colleges which include four-year colleges (that have at least one baccalaureate program) that grant associate's degrees to more than 50% of students. Third, there are baccalaureate colleges where baccalaureate degrees, or higher, represent at least 50% of all degrees at the institution but fewer than 50 masters and 20 doctoral degrees are awarded during a given year there. Fourth, there are master's colleges and universities where at least 50 master's degrees are awarded at the institution but fewer than 20 doctoral degrees are awarded. Fifth, there are doctoral universities where at least 20 research or scholarship doctoral degrees are awarded at the institution. Sixth, there are special focus institutions where there is a high concentration of degrees in a single field or related fields. These can be two- or four-year institutions and could include programs such as health professions, technical professions, arts professions, engineering schools, faith-related institutions, law schools, and business schools. Lastly, there are tribal colleges which are institutions that are members of the American Indian Higher Education Consortium. All of these institutions take into account factors from a student's academic achievement in high school including GPA and test scores when they are applying for admission (MyCollegeOptions, 2017). Public institutions are usually less expensive to attend

than private institutions: associate colleges are generally the lowest cost option. According to U.S. Department of Education National Center for Education Statistics (2016), there were 4,724 colleges and universities in the year 2013-2014, so many opportunities are available for students.

College Choice

A student's development of his or her educational plans after high school can be influenced by his or her family background, peers, academic performance, and experiences in high school (Hossler et al., 1999). While many in today's society believe students should enroll in postsecondary education (Hossler et al., 1999; Hoxby & National Bureau of Economic, 2004), and college enrollment was expected to increase by 15% between fall 2014 and fall 2025 (National Center for Education Statistics, 2015), some students may still chose not to attend college. Reasons students choose not to go to college can include: rising cost, fear of student loan debt, or time commitment that could interfere with getting married or having children (Hossler et al., 1999; Hoxby & National Bureau of Economic, 2004). The average college debt of graduates was at $26,600 in 2011 (Chen & Wiederspan, 2014). In addition, men are less likely to enroll in college (Schmitt & Boushey, 2012). Another option for students is a somewhat newer trend, which is for them to take a gap year (Fireside, 2009). This is when students take a year or two off after graduating from high school before pursing college. Fireside found that students that do this were more prepared than their peers by the time they went to college.

There are several predictors of a student's college choice and attendance. One predictor of students' college aspirations is academic achievement, which can be shown through grade point average (GPA). As a student's GPA increases organizational factors including college and university courtship activities lead to student outcomes of making a choice on the college they

are attending. Most high school students begin to formalize their educational plans for after high school between eighth and tenth grade (Hossler et al., 1999). Students' backgrounds have a significant impact on their postsecondary education choices (Bergerson, 2009). Parents and other family member's influence have the largest effect on students' college aspirations and is a known predictor of students' enrollment in college (Bergerson, 2009; Hossler et al., 1999). In addition, the higher a parent's education level is, the more likely a student is to pursue further education after, so does the likelihood that they plan to go to college (Bergerson, 2009; Hossler et al., 1999).

After students have made the decision to apply to college there are several factors that can help them navigate to find the best institution for themselves. A key factor in a student's college choice should be whether or not they have the right program for the career goals the student has (Hood, 1968). Students' decisions may be influenced by the academic prestige, reputation of an institution, or the financial cost (Bergerson, 2009; Goodman & Leiman, 2007; Hood, 1968). According to Chapman (1981) institutional cost as well as access to financial aid may limit students' options to what they see as realistic with their financial situations individually or as a family. Some student's may have a hard time narrowing down the schools they were accepted into, so they may need to revisit a campus or talk with students or faculty currently at that college to gain insight (Boyer & Boyer, 1996; Goodman & Leiman, 2007).

Relationship Between Substance Use and College Attendance

The available literature that explores a relationship between substance use and college attendance is limited. Patrick, Schulenberg, and O'Malley (2016) conducted a study focused on predictors of college attendance, completion, and dropout. The predictors they focused on included demographic characteristics, family background, high school grades, and high school

substance use. Patrick et al.'s study utilized data collected since 1975 through the Monitoring the Future (MTF) ongoing national study of adolescents as well as young adults. Surveys were administered to a representative sample of 16,000 American high school seniors in schools across the nation. Following the senior year questionnaire, around 2,400 individuals were randomly selected from the senior year cohort for a biennial follow up. All predictors of college attendance for this study were measured during the senior year of high school.

Patrick et al. (2016) conducted a series of three multivariate logistic regression analyses to address the predictors of college attendance. The results of the study showed that high school seniors who smoked cigarettes or used illegal drugs (not including marijuana) in the past 30 days had significantly lower odds of attending college; however, there was no significant differences for binge drinking (consuming five or more drinks in a row) or marijuana use. Surprisingly the study found that the high school seniors who engaged in binge drinking were more likely to graduate from a four-year college than they were to drop out. Patrick et al. believed this likely resulted from several processes regarding alcohol consumption including anticipatory socialization and the social integration function of alcohol consumption during this stage of life.

While the study conducted by Patrick et al. (2016) was a helpful contribution to examining a relationship between substance use in high school and college attendance, there were a few limitations of the study that the current study presented could address. First, attrition biases their sample toward those that are functioning better. Second, the biennial follow-up surveys were conducted at different times for different parts of the cohort. Lastly, the predictors of college attendance in their study were only measured in their senior year of high school. Overall, Patrick et al. provided a helpful broad overview of patterns of college attendance related to substance abuse and has set the stage for future research regarding these patterns.

College Choice Models

While there are several models of college choice, three have been identified as important to this study. Chapman (1981) developed a model of the influences affecting prospective students' choice of which college to attend. The goal of the model is to assist college administrators in identifying the pressures and influences they should consider when developing and revising their institutional recruiting policy as well as aid the research surrounding college choice. Chapman's model establishes a series of external influences in combination with student characteristics to influence student college choice. The student characteristics identified by Chapman were socioeconomic status, aptitude, level of educational aspiration and expectation, and high school performance. The external influences are grouped by the influence of significant persons, the fixed characteristics of the institution, and the institutions efforts to communicate with prospective students. Significant persons can influence students in three ways: their comments shape what a student thinks a particular college is like, they offer advice on where they should attend, and they may be a peer of the student and influence them simply through their own choice of attending an institution. The relatively fixed college characteristics include location, costs, campus environment, and the availability of desired academic programs. Lastly, communication with prospective students is now being seen as a marking approach where the following steps are taking place: research on current and prospective students, development of a market plan, and development of new strategies involving both programs and the communication process.

Choosing a college to attend can be a difficult process for students. Hossler and Gallagher (1987) created a model for understanding the comprehensive college choice process. After a survey of research, Hossler and Gallagher identified three phases of the college choice

process. The first phase is the predisposition of students to attend college based on individual factors including student characteristics, significant others, and educational activities and organizational factors including school characteristics lead to the student outcome of deciding if they want to continue education beyond high school. Students then move into the search phase, in which individual factors including the students' preliminary college values and their search activities and organizational factors including the college and universities' search for students lead to student outcomes of having a list of college choices or college alternatives and other options. The third phase is choice, in which students' individual factors including choice set and high school (Hossler et al., 1999).

The theoretical framework for this study was Braxton's (2000) behavioral student-centered model of college choice and persistence. This was selected as the theoretical framework due to its saturation in the literature as well as its focus on a student's background, school experiences, and intentions and preparations which all may have a relationship to substance use. The key elements of Braxton's model include background, school experiences, intentions and preparations, college entry, and persistence and dropout (in that order). In Braxton's model, background includes a student's family experience, cultural factors, socioeconomic status, ability, and the level of parental encouragement. These background factors are important as they can shape or influence a student's beliefs and intentions as well as other behaviors. School experiences should be considered from both middle and high school. Experiences could include teachers' encouragement or lack thereof, the influence of peers, the role of counselors, parental support in the school setting, and interactions with family to begin the creation of postsecondary education intentions. This leads into the next factor of the model: intentions can influence a range of behaviors. In regard to intentions of attending postsecondary

education, students may seek advice, take college preparatory classes, volunteer, engage in career exploration, and begin the college search. Successful participation in activities such as these can have a heavy influence on post-high school graduation goals. College entry initiates behaviors that could determine success or drop out in college for the students. A variety of factors can impact this including selecting the right level courses, engaging socially, and establishing study patterns. Students' success can be influenced by the factors mentioned previously of background and preparation. If students have more guidance from family and are engaged in more of the college preparation activities, it is more likely they will enter college with motivations and be ready to engage socially and academically. Lastly, students will ultimately decide to persist or depart from college based on the factors in this model.

For many students, the process of selecting a college is quite careless and unplanned (Tinto, 1993). While there are a large amount of data on different types of colleges, many potential college students do not utilize them. They can easily obtain information about institutions' size, faculty, students, mission statements, resources, and programs. However, it can be more difficult for them to experience or learn the social and intellectual climate of the campus without visiting the campus for several days. A student can be mismatched with an institution if he or she had poor or uninformed choices, which can in turn have an effect on institutional participation. Tinto noted poor college choice has been found as a primary cause of 20% of students that transfer between institutions. High school students who had greater access to information about their college options reported later that they had a greater satisfaction at the college they had enrolled in (Braxton, 2000).

The availability of colleges or universities in the area a student grows up in may also have an influence on their college choice process. Tinto (1973) found college attendance to be

related to the presence of a local college and the type of college it was. The effect of local college availability on college attendance rates was largest for junior colleges followed by state colleges. Tinto (1975) found that the local availability of a public junior college can alter patterns of college attendance by substituting attendance locally rather than going elsewhere.

Choosing a college involves students forming a set of expectations of the character of the institution students wish to attend (Tinto, 1993). The more accurate and realistic the expectations set are, the more likely it is that a student will be matched optimally to an institution. If students set unrealistic or mistaken expectations, he or she-can choose to adapt their expectations, otherwise they may feel mislead and betrayed. Braxton, Vesper, and Hossler (1995) found that when the expectations that prospective students had formed were met, they were more likely to be committed to graduating from the college they had enrolled in. It should be noted that there are differences in the college choice process and the college persistence process for nontraditional students (Braxton, 2000).

Summary

Many people in the American society believe it is important for students to attend some form of postsecondary education. Students have many options when selecting a postsecondary institution, but choosing a college can be a difficult process for them. Tinto's (1993) model of student departure from institutions of higher education helps to explain the influencing factors before a student enrolls in college. Braxton (2000) reassessed that model and recognized the importance of the process of students choosing a college. He created his own model of college choice and persistence which is the theoretical framework for this study.

Substance misuse is a problem affecting the American society. Young adulthood is an increased time for substance use and can have negative consequences for students. Currently

there is limited information available on the relationship between substance use and college attendance. However, a study by Patrick et al. (2016) found certain substances do lower the odds of students attending college while others do not.

CHAPTER THREE: METHODOLOGY

Design of the Study

Routine substance use among high school students was examined to see if it impacted their decision to attend college. The type of college students attended was also examined. A quantitative approach was used because data provided evidence to evaluate high school students' decision to attend college (and the type of college) based on frequency of substance use throughout high school and gender.

Purpose of the Study

The purpose of this study was to determine if there was a statistically significant relationship between routine substance use (including at least one of the following: cigarettes, alcohol, marijuana, inhalants, and methamphetamine) in high school, college attendance, and type of college attended (trade school/community college or four-year college/university). In this study routine substance use is defined as: smoking a few times or more in the past month; drinking beer, wine, wine coolers, or other liquor a few times or more in the past month; becoming drunk after drinking wine, wine coolers, or other liquor one or more times in the past month; smoking marijuana a few times or more in the past month; using inhalants three or more times in the past year; and using methamphetamine one or more times in the past year.

Research Questions

The following research questions were asked in this study:

1. Does the influence of routine substance use (including at least one of the following: cigarettes, alcohol, marijuana, inhalants, and methamphetamine) in high school students on college attendance vary by factors including gender and geographic location?

2. Are there statistically significant relationships in college attendance among students who engaged in routine substance use (including at least one of the following: cigarettes, alcohol, marijuana, inhalants, and methamphetamine) in high school compared to students who did not engage in routine substance use in high school?
3. Are there statistically significant relationships in the type of college attended (i.e., trade school/community college or four-year college/university) among students who engaged in routine substance use (including at least one of the following: cigarettes, alcohol, marijuana, inhalants, and methamphetamine) in high school compared to students who did not engage in routine substance use in high school?

Hypotheses

The following hypotheses were tested in this study:

1. Females will have a higher rate of college attendance than males. Students who did not engage in routine substance use (including at least one of the following: cigarettes, alcohol, marijuana, inhalants, and methamphetamine) in high school will have a higher rate of college attendance than students that did engage in routine substance use in high school. There will not be a difference in college attendance in students based upon geographic location.
2. College attendance rates will be significantly higher for students who did not engage in routine substance use (including at least one of the following: cigarettes, alcohol, marijuana, inhalants, and methamphetamine) in high school.
3. Attendance rates at a four-year college or university will be significantly higher for students who did not engage in routine substance use (including at least one of the following: cigarettes, alcohol, marijuana, inhalants, and methamphetamine) in high

school compared to a trade school or community college. Attendance rates at a trade school or community college will be higher for students who did engage in routine substance use in high school compared to a four-year college or university.

Population and Sample

High school students from the states of Pennsylvania and Iowa were the population for this study. The sample was two cohorts of students selected from 28 public school districts in Iowa and Pennsylvania that were recruited for a study to evaluate the Promoting School-community-university Partnerships to Enhance Resilience (PROSPER) program (Redmond, Spoth, Schainker, & Feinberg, 2016; Spoth, Greenberg, Bierman, & Redmond, 2004). Findings from that study supported PROSPER as a scientifically-validated delivery system that facilitates quality delivery of evidence-based programs that: reduce risky youth behaviors, enhance positive youth development, and strengthen families (Iowa State University, 2018; Redmond et al., 2016). It links university-based prevention researchers with established program delivery systems within a state including the Cooperative Extension System at the land grant university and the public school system. Public school districts for the PROSPER study were selected on the basis of having enrollment between 1,300 and 5,200 students and at least 15% of the student population eligible for free or reduced lunch (Redmond et al., 2009). In addition, communities with over 50% of their population employed by or attending a college or university, and communities that were involved in other prevention research projects with youth, were excluded. Among the school districts that participated, the population of their primary communities ranged from 6,975 to 44,510 based on the 2000 Census, thus, they were rural towns and small cities. Thirty-one percent of the students reported receiving free or reduced cost school lunch.

The baseline sample (sixth grade), consisting of intervention and control groups, had 10,849 students. The intervention group consisted of 14 school districts that received intervention through prevention programming (Redmond et al., 2009). The school district communities had community teams formed to manage preventative intervention delivery supported by the PROSPER model through structured training and technical assistance provided to the community teams. The community teams selected one evidence-based universal family-focused program and one evidence-based classroom program out of three options, each, provided by the university research team. The family-focused program was offered to sixth graders and their parents; the classroom program was provided as part of the regular seventh grade school curriculum. The control group consisted of 14 school districts that did not receive any project support for prevention programming. However, the control groups were able to implement any programming their communities and school districts had normally provided. Approximately 50% of the students were from Iowa and the other 50% were from Pennsylvania. Two cohorts of students were identified. Both cohorts had students that started in the sixth grade: cohort one started during the 2002-2003 school year, and cohort two started during the 2003-2004 school year. The full sample completed a pretest survey in the fall of sixth grade. Follow-up surveys were conducted each spring through the twelfth grade. From among those pretested, 1,988 were randomly selected to complete phone surveys after high school as emerging adults (at approximately age 19). The majority of the students in the sample were White (85%) while the largest group of minority students was Hispanic/Latino (5%). The sample included a similar number of girls (51%) and boys (49%). Sixty-four percent of students reported living with both biological parents.

The sample for this study was the 1,988 students selected for continued follow-up after high school (Spoth et al., 2017). For this study, frequency of substance use and gender were gathered from the follow-up questionnaires the students completed at school in ninth through twelfth grade (2006-2010). Students' choice to attend college and information regarding type of college attended was gathered from the emerging adult follow-up questionnaire administered via phone at age 19 (2010-2011).

Research Approach

A quantitative approach was used in this study to examine the relationship between routine substance use in high school students and college attendance. Quantitative research methods allow researchers to measure certain phenomena or behaviors and then represent data in numbers (Given, 2008). In this study the research method selected questions the ability to generalize about relationships between well-defined variables. Additionally, a quantitative approach allows the ability to generalize results to students across the United States.

Quantitative research uses both descriptive and inferential statistics. These statistics have been used to investigate significant differences in the sample that have the ability to generalize to the underlying population. Cross-tabulation with the Chi square and Cochran's and Mantel-Haenszel statistics was the method of inferential statistics used to answer the three research questions presented. The Chi square test is able to test whether two or more categorical variables are independent of one another (Elliot, Fairweather, Olsen, & Pampaka, 2016) while the Cochran's and Mantel-Haenszel statistics generate an estimate of an association between an exposure and outcome after taking into account (or adjusting for) confounding variables (Boston University School of Public Health, 2016). Data utilized in the study were collected by the

Partnerships in Prevention Science Institute at Iowa State University, and therefore were considered archival (Turiano, 2014).

Data Collection Procedures

Data for this study were retrieved by the researcher from the Partnerships in Prevention Science Institute (PPSI) collection of archival data. Institutional Review Board approval was obtained prior to data collection by Iowa State University and the researcher (Appendix A). PPSI is a multidisciplinary non-profit research institute within Iowa State University in Ames, Iowa (Iowa State University Partnerships in Prevention Science Institute, 2018). Its mission is to "conduct practical research that focuses on promoting capable and healthy youth, adults, families, and communities" (para. 1). The goals of PPSI's research include the following: (a) expand the evidence base on the effectiveness of prevention, positive youth development, and health promotion interventions for youth, adults, families, and communities; (b) evaluate engagement of youth, adults, and families in evidence-based prevention and health promotion intervention projects; and (c) evaluate community-school-university partnership approaches to dissemination of evidence-based prevention, positive youth development, and health promotion interventions, including factors related to quality delivery and sustainability.

The data for this study were from PPSI's Promoting School-community-university Partnerships to Enhance Resilience (PROSPER) research project. For the PROSPER project, written questionnaires were administered to students while they were in grades sixth through twelfth. They then followed-up by administering questionnaires via phone to a randomly selected group of students at approximately age 19 that served as an emerging adult assessment. For this study data will be pulled from the questionnaire administered in grades ninth through twelfth as well as at age 19 (2006-2011).

New variables were created in addition to the variables received through the archival data. The first new variable created was a variable for gender that summed the results for all four year. The same was done for all four years in regards to state. These two variables were created in order to determine control variables for the study. Gender was recoded to account for the missing answers in the data so that only those that identified as a female or male were utilized. Two new variables were created in regard to the data from the age 19 survey. A variable was created to determine if students had attended any or no college. Another variable was created to determine type of college attended by grouping trade schools and community colleges as one code and four-year colleges or universities as the second code. Lastly, a new variable was recoded for substance use for any year (use anytime between freshman and senior year), use freshman year, use sophomore year, use junior year, and use senior year. These were recoded so that the data reflected the frequencies of use that define routine substance use for this study in Chapter 1.

Data Analysis

Frequencies (counts and percentages) of high school students' use of substances, choice to attend college, type of college attended, gender, and state are presented in table format in Chapter 4. Preliminary analyses of grades received in high school, high school bonding, gender, and state were ran to determine if they were significant enough to control for. Only gender and state were found to be significant. The analyses showed that 54.4% of males routinely used substances compared to 57.3% of females and that 49.4% of the Iowa students routinely used substances compared to 63.4% of the Pennsylvania students. These variables were controlled for to answer Research Question 2 and Research Question 3. By controlling for these variables in the analyses it removed the influence of gender and state from the equation so that the research

questions could be answered without gender and state influencing the outcomes. To answer the three research questions presented, cross-tabulation with the Chi square and Cochran's and Mantel-Haenszel statistics was the method of inferential statistics used. For Research Question 1, significant differences between routine substance use in high school students and college attendance after controlling for gender and geographic location (state) were analyzed with the Chi square and Cochran's and Mantel-Haenszel statistics, with gender and geographic location serving as control variables. Gender was controlled for as it is a known predictor of college attendance (Schmitt & Boushey, 2012). Chi square was used to determine whether there was a significant difference between routine substance use in high school students and college attendance (Research Question 2) and between routine substance use in high school students and type of college attended (Research Question 3). In both cases, gender and state served as control variables using the Cochran's and Mantel-Haenszel statistics to determine whether significant differences exist after controlling for gender. The SPSS analyses cannot control for two variables at the same time in the Crosstabs procedure so there were two analyses run for Research Question 2 (one controlling for state and one controlling for gender) and two analyses run for Research Question 3. Cross-tabulation with the Chi square statistics was the appropriate procedure given that independent, dependent, and control variables were on a categorical scale.

Data Presentation

Descriptive and inferential statistics of high school students' substance use frequency, choice to attend college, type of college attended, and differentiated by gender and geographic location will be presented in table format in chapter four. The data are presented in the order of the research questions. Chapter five includes discussion of the results.

Summary

Chapter three described the methods used to obtain the data in this study. A quantitative approach was used to determine the relationship between regular substance use (including cigarettes, alcohol, marijuana, inhalants, and meth) in high school students, their college attendance, and type of college attended (trade school/community college or four-year college/university) to provide concrete numerical evidence. To answer the three research questions presented, cross-tabulation with the Chi square and Cochran's and Mantel-Haenszel statistics was the method of inferential statistics used. Grades students generally received and gender were controlled for as they are known to influence college attendance. Data were archival and were collected from PPSI. Findings from the data analysis section will be used in relation with Tinto's (1993, 1988) model of student departure and Braxton's (2000) behavioral student-centered model of college choice and persistence to understand how college attendance is impacted for high school students who have engaged in regular substance use.

CHAPTER FOUR: RESULTS

Summary of the Study

The intent of this study was to examine the relationship between routine substance use in high school students, college attendance, and type of college attended. In this study routine substance use was defined as:

- Smoking a few times or more in the past month.
- Drinking beer, wine, wine coolers, or other liquor a few times or more in the past month.
- Becoming drunk after drinking wine, wine coolers, or other liquor one or more times in the past month.
- Smoking marijuana a few times or more in the past month.
- Using inhalants three or more times in the past year.
- Using methamphetamine one or more times in the past year.

Investigating the relationship between routine substance use in high school students, college attendance, and type of college attended allows for educators to better support both high school and college students in the future. Quantitative methodology was used to answer the research questions presented as cross-tabulations with the Chi square and Cochran's and Mantel-Haenszel statistics. Gender was controlled for as it is a known predictor of college attendance as well as geographic location (state). This method allowed for the ability to test whether two or more categorical variables are independent of one another while also generating an estimate of association between an exposure and outcome.

Participants

The participants for this study consisted of 1,988 students that completed the PROSPER program questionnaires in high school their freshman year through their senior year and at age

19. From the 1,988 student participants, smaller samples were created for the analyses after accounting for unanswered questions on the questionnaire that was administered. Of the 1,988 student participants, 960 where from Pennsylvania and 1,028 were from Iowa. In regards to gender, 1,069 identified as female and 904 identified as male. The analyses in this chapter were broken down by looking at routine substance use (or lack of use) that occurred any year in high school, as well as each individual year, which also influenced the influx in participants by each individual analysis. The data consisted of a large enough sample to allow for an accurate representation of the relationship between routine substance use in high school students, college attendance, and type of college attended.

Major Findings

Major findings were categorized into three sections to reflect the research questions, including:

- The differences in college attendance and substance use by gender and geographic location (state).
- The relationship between college attendance among students who engaged in routine substance use (including at least one of the following: cigarettes, alcohol, marijuana, inhalants, and methamphetamine) in high school, compared to students who did not engage in routine substance use in high school.
- The relationship between the type of college attended (i.e., trade school/community college or four-year college/university) by students who engaged in routine substance use (including at least one of the following: cigarettes, alcohol, marijuana, inhalants, and methamphetamine) in high school, compared to students who did not engage in routine substance use in high school.

All major findings controlled for the impact of gender and geographic location (state). These control variables were used because they were found to be significant in a preliminary analysis. By controlling for these variables it allows the results of the study to be uninfluenced by gender and state. A cross-tabulation with the Chi square and Cochran's and Mantel-Haenszel statistics was used to produce results on the relationship between routine substance use and college attendance as well as between routine substance use and type of college attended. The cross-tabulation with the Chi square and Cochran's and Mantel-Haenszel statistics that controlled for gender was used to assess differences in college attendance by gender (Table 1). Differences in college attendance by geographic location (state) was assessed through the cross-tabulation with the Chi square and Cochran's and Mantel-Haenszel statistics that controlled for geographic location (state) (Table 2).

Gender, Geographic Location, and Substance Use

Gender. Table 1 examined the differences in college attendance and substance use by gender. There were a total of 523 females that attended college and 396 males that attended college. Nearly 58 % of females, and 54.4% of males, routinely used substances in high school. Of the females that reported routinely using substances, 298 (98.0%) attended college. Of the males that routinely used substances, 213 (96.8%) attended college. Only 2.0% of females that routinely used substances did not attend college while 3.2% of males that routinely used substances did not attend college.

State. The differences in college attendance and substance use by state are examined in Table 2. Of the sample, 440 students were from Pennsylvania and 498 students were from Iowa. More than 64% of students in Pennsylvania, and 49.4 % of students in Iowa, used substances in high school. Of the Pennsylvania students that routinely used substances, 273 (97.8%) attended

college. Of the Iowa students that routinely used substances, 239 (97.2%) attended college. Only 2.2% of Pennsylvania students that routinely used substances did not attend college while in Iowa 2.8% of students that routinely used substances did not attend college.

College Attendance and Substance Use

Controlling for gender. Table 3 utilized a cross-tabulation with the Chi square to analyze the relationship between routine substance use in high school anytime between freshman and senior year and college attendance when controlling for gender. Of the sample, 99.5% that did not use substances attended college and 97.5% that routinely used substances attended college. The results of the cross-tabulation with the Chi square and Cochran's and Mantel-Haenszel statistics found that there is a significant relationship between substance use any year in high school and college attendance with a p-value of $p < .05$ for the Chi square, Cochran's, and Mantel-Haenszel statistics. This analysis reflected the data of 934 students.

When examining the relationship between routine substance use freshman year and college attendance (while controlling for gender) with the cross-tabulation and Chi square it was found to be a highly significant relationship (Table 3). The results showed a p-value of $p < .01$ for the Chi square, Cochran's, and Mantel-Haenszel statistics. This analysis included the data of 1,538 students. Of those that did not use substances 3.1% did not attend college while 96.9% did attend college. Of those that routinely used substances, 6.3% did not attend college while 93.7% did attend college.

Routine substance use sophomore year and the college attendance relationship were analyzed with the cross-tabulation and Chi square in Table 3. This analysis controlled for gender and reflected data from 1,414 students. Among these students, 961 (97.8%) that did not use substances attended college while 406 (94.2%) that routinely used substances attended college.

The relationship was found to be highly significant with results creating a p-value of $p < .01$ from the Chi square, Cochran's, and Mantel-Haenszel statistics.

Table 3 also report data for routine substance use junior year and college attendance while controlling for gender. . The results showed a p-value of $p < .01$ for Mantel-Haenszel statistics and $p < .001$ from Chi square and Cochran's statistics. Of the students that did not use substances, 1.3% did not attend college while 98.7% did attend college. Of the students that routinely used substances, 4.3% did not attend college while 95.7 % did attend college. This analysis utilized data from 1,300 students.

The data of 1,206 students was utilized when examining routine substance use senior year and college attendance while controlling for gender (Table 3). The cross-tabulation and Chi square found that 98.8% (663) of students that did not use substances attended college and 97.2% (520) of students that routinely used substances attended college. Thus, 1.2% (8) of students that did not use substances did not attend college and 2.8% (15) of students that routinely used substances did not attend college. The relationship between routine substance use senior year and college attendance was found to be significant with a p-value of $p < .05$ for Chi square and Cochran's statistics.

Controlling for state. Table 4 utilized a cross-tabulation with the Chi square to analyze the relationship between routine substance use in high school anytime between freshman and senior year and college attendance when controlling for state. From the sample, 99.5% that did not use substances attended college and 97.5% that routinely used substances attended college. The results of the cross-tabulation with the Chi square and Cochran's and Mantel-Haenszel statistics found that there is a significant relationship between substance use any year in high

school and college attendance with a p-value of $p < .05$ for the Chi square, Cochran's, and Mantel-Haenszel statistics. This analysis reflected the data of 938 students.

When examining the relationship between routine substance use freshman year and college attendance (while controlling for state) with the cross-tabulation and Chi square it was found to be a highly significant relationship (Table 4). The results showed a p-value of $p < .01$ for the Chi square, Cochran's, and Mantel-Haenszel statistics. The data of 1,547 students was included in the analysis. Of those that did not use substances 3.1% did not attend college while 96.9% did attend college. Of those that routinely used substances, 6.3% did not attend college while 93.7% did attend college.

Routine substance use sophomore year and the college attendance relationship were analyzed with the cross-tabulation and Chi square in Table 4. This analysis controlled for state and reflected data from 1,424 students. Of the 1,424 students, 97.7% (967) of students that did not use substances attended college and 94.2% (409) of students that routinely used substances attended college. Thus, 2.3% (23) of students that did not use substances did not attend college and 5.8% (25) of students that routinely used substances did not attend college. The relationship was found to be highly significant with results creating a p-value of $p < .01$ from the Chi square, Cochran's, and Mantel-Haenszel statistics.

Table 4 also reports the analysis of routine substance use junior year and college attendance when controlling for state. The results showed a p-value of $p < .01$ for Mantel-Haenszel statistics and $p < .001$ from Chi square and Cochran's statistics. These results mean there is a highly significant and very highly significant relationship. This analysis utilized data from 1,305 students. Of the students that did not use substances, 1.3% did not attend college

while 98.7% did attend college. Of the students that routinely used substances, 4.3% did not attend college while 95.7 % did attend college.

The data of 1,213 students was utilized when examining routine substance use senior year and college attendance while controlling for gender. The cross-tabulation and Chi square found that the relationship between routine substance use senior year and college attendance was not significant.

Type of College Attended and Substance Use

Controlling for gender. A cross-tabulation and Chi square was used in Table 5 to determine the relationship between routine substance use any year in high school (freshman through senior year) and type of college attended. This analysis controlled for gender. College attendance was categorized by attendance at a trade school or community college and attendance at a four-year college or university. The relationship was found to be significant with a p-value of $p < .05$ for the Chi square, Cochran's, and Mantel-Haenszel statistics. A total of 38.6% of students attended a trade school or community college while 61.4% attended a four-year college or university. When broken down by those that did not use substances the results found that 34.6% of students attended a trade school or community college and 65.4% attended a four-year college or university. Of the students that routinely used substances, 41.9% attended a trade school or community college and 58.1% attended a four-year college or university. This analysis reflected data from 919 students.

To analyze the relationship between routine substance use freshman year and type of college attended a cross-tabulation and Chi square was used while controlling for gender (Table 5). The analysis included data from 1,477 students. Results showed that 39.9% (442) students that did not use substances their freshman year attended a trade school or community college and

60.1% (666) attended a four-year college or university. Of the students that routinely used substances their freshman year, 53.1% (196) attended a trade school or community college and 46.9% (173) attended a four-year college or university. The cross-tabulation found the relationship between routine substance use freshman year and type of college attended to be very highly significant with a p-value of $p < .001$.

Routine substance use sophomore year and type of college attended while controlling for gender was examined in Table 5. A cross-tabulation and Chi square analysis was utilized. The results found this relationship to be very highly significant. A p-value of $p < .001$ was found with the Chi square, Cochran's, and Mantel-Haenszel statistics. This reflected the data of 1,367 students. There were 596 (62.0%) students that did not use substances that attended a four-year college or university and 191 (47.0%) students that routinely used substances that attended a four-year college or university. There was an attendance of 365 (38.0%) students that did not use substances at a trade school or community college and 215 (53.0%) that routinely used substances at a trade school or community college.

The data of 1,267 students are shown is Table 5. A cross-tabulation and Chi square was used to analyze the relationship between routine substance use junior year and type of college attended. Gender was controlled for in this analysis. Of the students represented in this analysis that did not use substances, 37.3% attended a trade school or community college and 62.7% attended a four-year college or university. Of the students that routinely used substances, 49.2% attended a trade school or community college and 50.8% attended a four-year college or university. The relationship in this analysis was found to be very highly significant with a p-value of $p < .001$ for the Chi square, Cochran's, and Mantel-Haenszel statistics.

The relationship between routine substance use senior year and type of college attended was found to be highly significant with a p-value of $p < .01$ for the Chi square, Cochran's, and Mantel-Haenszel statistics (Table 5). A cross-tabulation with the Chi square was used to produce these results while controlling for gender. Of the 1,183 students represented in this analysis, 35.6% that did not use substances and 45.2% that routinely used substances attended a trade school or community college. Additionally, 64.4% of students that did not use substances their senior year and 54.8% of students that routinely used substances their senior year attended a four-year college or university.

Controlling for state. A cross-tabulation and Chi square was used in Table 6 to determine the relationship between routine substance use any year in high school freshman through senior year and type of college attended while controlling for state. The relationship was found to be significant with a p-value of $p < .05$ for the Chi square and highly significant with a p-value of .01 for the Cochran's and Mantel-Haenszel statistics. A total of 38.6% of students attended a trade school or community college while 61.4% attended a four-year college or university. Results showed that 34.5% of students attended a trade school or community college and 65.5% attended a four-year college or university when they had not used substances. Of the students that routinely used substances, 41.8% attended a trade school or community college and 58.2% attended a four-year college or university. This analysis reflected data from 923 students.

To analyze the relationship between routine substance use freshman year and type of college attended a cross-tabulation and Chi square was used while controlling for state (Table 6). The analysis included data from 1,486 students. Results of this analysis showed that 39.9% students that did not use substances their freshman year attended a trade school or community college and 60.1% attended a four-year college or university. Of the students that routinely used

substances their freshman year, 53.0% attended a trade school or community college and 47.0% attended a four-year college or university. The results found the relationship between routine substance use freshman year and type of college attended to be very highly significant with a p-value of $p < .001$.

Routine substance use sophomore year and type of college attended while controlling for state was examined in Table 6. A cross-tabulation and Chi square analysis was utilized and the relationship was found to be very highly significant. A p-value of $p < .001$ was found with the Chi square, Cochran's, and Mantel-Haenszel statistics. This analysis reflected the data of 1,376 students. There were 600 (62.0%) students that did not use substances that attended a four-year college or university and 192 (46.9%) students that routinely used substances that attended a four-year college or university. There was an attendance of 367 (38.0%) students that did not use substances at a trade school or community college and 217 (53.1%) that routinely used substances at a trade school or community college.

The data of 1,273 students is shown is Table 6. A cross-tabulation and Chi square was used to analyze the relationship between routine substance use junior year and type of college attended. State was controlled for in this analysis. Of the students represented in this analysis that did not use substances, 37.3% attended a trade school or community college and 62.7% attended a four-year college or university. Of the students that routinely used substances, 49.2% attended a trade school or community college and 50.8% attended a four-year college or university. The relationship in this analysis was found to be very highly significant with a p-value of $p < .001$ for the Chi square, Cochran's, and Mantel-Haenszel statistics.

The relationship between routine substance use senior year and type of college attended was found to be highly significant for Chi square with a p-value of $p < .01$ and very highly

significant for Cochran's and Mantel-Haenszel statistics with a p-value of $p < .001$ (Table 6). In this table a cross-tabulation with the Chi square was used while controlling for state. There were 1,189 students represented in this analysis. Of the students in this analysis, 35.5% that did not use substances and 45.1% that routinely used substances attended a trade school or community college. Additionally, 64.5% of students that did not use substances their senior year and 54.9% of students that routinely used substances their senior year attended a four-year college or university.

Summary

This chapter presented results on the relationships between routine substance use in high school, college attendance, and type of college attended. It also examined differences in college attendance by gender and geographic location (state). A cross-tabulation analysis with Chi square and Cochran's and Mantel-Haenszel statistics was used throughout the whole chapter. Analyses controlled for gender as well as state. Overall, results showed that there are differences in college attendance by gender and state (Tables 1-2). Students that did not use substances have a higher rate of college attendance than their peers that did routinely use substances (Tables 3-4). Students that did not use substances were also more likely to attend a four-year college or university rather than a trade school or community college while students that did routinely use substances were more likely to attend a trade school or community college than a four-year college or university (Tables 5-6).

CHAPTER FIVE: DISCUSSION

Summary of the Study

The relationship between routine substance use in high school students and college attendance was examined in this study. The type of college students attended as well as differences in college attendance by gender and geographic location were also analyzed. The results of this study are important because they validate the importance of substance use prevention and intervention in adolescents. They also may help to better prepare educators to support these students in their college choice process as well as make postsecondary admissions representative more knowledgeable about this subpopulation of students so they may better help recruit and transition them to college.

While there are several significant college choice models, Braxton's (2000) behavioral student-centered model of college choice and persistence was the theoretical framework for this study. Braxton's theory has five key elements: background, school experiences, intentions and preparations, college entry, and persistence and dropout. A student's background and school experiences can shape their beliefs and intentions regarding college. Thus, this model aligns well with how a student's experience with substance use may shape their college attendance.

There has been little research done on the relationship between routine substance use in high school, college attendance, and type of college attended. However, the literature supports Braxton's college choice model by expanding upon the influence factors such as family background, academic performance, peers, and experiences in high school can have on a student's educational plans after high school. Patrick, Schulenberg, and O'Malley (2016) examined high school seniors and found that those that smoked cigarettes or used illegal drugs

had significantly lower odds of attending college however, there were no significant differences for students who binge drank or used marijuana.

Data utilized in this study were archival and were obtained from the Partnerships in Prevention Science Institute at Iowa State University. Information from 1,988 students that completed the Promoting School-community-university Partnerships to Enhance Resilience (PROSPER) program questionnaires freshman through senior year of high school and at age 19 was used. Cross-tabulation with the Chi square and Cochran's and Mantel-Haenszel statistics was the method used to analyze the data. A preliminary analysis was done that determined gender and state were significant variables that should be controlled for. Gender is a known predictor of college attendance. By controlling for these variables the analyses were able to show results without the influence of gender and state by essentially taking them out of the equation so confounding did not occur.

The results of this study were shown by any routine substance use in high school freshman through senior year, as well as routine substance use during each year in high school. It was found that there were differences in college attendance by gender and state (Tables 1-2) and that students that did not uses substances attended college at a higher rate than those that did routinely use substances (Tables 3-4). Additionally, the results showed that it is more likely for student to attend a four-year college or university rather than a trade school or community college if they have not used substances while students that have used substances are more likely to attend a trade school or community college (Tables 5-6).

Gender, Geographic Location, and Substance Use

The first research question of this study focused on understanding if the influence of routine substance use in high school students on college attendance varied by factors including

gender and geographic location (state). The analysis on college attendance by gender and substance use (Table 1) showed that more females routinely used substances than males. While the literature did not discuss much about a difference in substance misuse between males and females, it did talk about factors that could influence an individual's substance use and misuse including low socio-economic status, peer influence, social support, parental substance use, sensation seeking, perceived risks, mental health, stress, school environment, attitudes, self-esteem, peer delinquency, and street involvement (Kirst, Mecredy, Borland, & Chaiton, 2014). This means that while the study found more females using substances than males, it could have solely been based on their individual backgrounds and characteristics rather than their gender.

The hypothesis that females will have a higher rate of college attendance than males was found to be true. While females routinely used substances at a higher rate than males, they also attended college at a higher rate than males. While this is a bit surprising since other results of the study show that students who have used substances are less likely to attend college, it does align with Schmitt and Boushey's (2012) findings that men are less likely to enroll in college. Their findings were not considering if the males or females had used substances and were strictly looking at college attendance by gender. There was not a large difference in college attendance between females and males that had not used substances. This may infer that the relationship that was found between gender and college attendance is indeed influenced by substance use. Hossler and Gallagher (1987) identified the predisposition of students to attend college based on individual factors including student characteristics as the first phase in their college choice process. Chapman (1981) and Braxton (2000) also identified a student's characteristics as a key part of a student's decision to attend college in their college choice models. This aligns well

with the study's findings regarding gender as it can be a key characteristic of a student which could influence their student success.

The analysis on college attendance by state and substance use (Table 2) showed that more Pennsylvania students routinely used substances than Iowa students. The differences between substance use in the two states could be due to the accessibility of substances, culture or social norms regarding substance use, or alternative activities available to high school students to utilize their time with instead of using substances. Another thing that was not identified in this study was the substance use trends in both states. Pennsylvania could simply have a higher number of people using or misusing substances across the state than Iowa. Pennsylvania students also attended college at a slightly higher rate than Iowa students if they had been routinely using substances. This contradicted the hypothesis that there would not be a difference in college attendance in students based upon geographic location. There was a small difference in college attendance in Pennsylvania students and Iowa students that had not used substances with Iowa students attending college at a slightly higher rate than Pennsylvania students. It is hard to tell from this study why there is a difference between college attendance based upon geographic location. There is also a gap in the literature when it comes to how the state a student lives in can influence or impact their college attendance.

College enrollment was expected to increase by 15% between fall 2014 and fall 2025 so one things that is not surprising that a majority of students from both states attended college (National Center for Education Statistics, 2015). Braxton's (2000) model of college choice also identified a student's school experiences as a key element of the model. Because school systems may be ran differently due to being located in different states, it is not surprising that the substance use patterns differed between the two states. Community and school contexts may

play a role in increasing risk for substance use (Milam, Johnson, Furr-Holden, & Bradshaw, 2016). It also should be noted that there may be different social norms within the state cultures which may also contribute to the difference in substance use and college attendance.

College Attendance and Substance Use

The second research question of this study focused on understanding if there were statistically significant relationships in college attendance among students who engaged in routine substance use in high school compared to students who did not engage in routine substance use in high school. The study revealed that there was a statistically significant relationship between substance use and college attendance when controlling for gender as well as state. This means that a student's substance use in high school does impact whether or not they will attend college. This also could in turn influence some of the other aspects of their life as going to college can lead to higher salaries, career mobility, and a higher quality of life (Hossler, Schmit, & Vesper, 1999; Tinto, 2012). While the patterns of substance use and college attendance varied slightly between substance use any time in high school, freshman year, sophomore year, junior year, and senior year, the relationship was found to be significant in all years except for senior year when controlling for state (Table 3; Table 4). It is not surprising that senior year was not found to be significant in this case as often times high school students have secured there plans after college during their junior year or the beginning of their senior year. Routine substance use freshman, sophomore, and junior year also may have an impact on a student's grades and involvement in school which could in turn impact their college applications.

The results of this study showed that in general, a higher percentage of the students that did not use substances in high school attended college compared to students that routinely used substances in high school. Similarly, it was found that a higher percentage of students that

routinely used substances did not attend college than the students that did not use substances. This supported the hypothesis that college attendance rates will be significantly higher for students who did not engage in routine substance use in high school. The hypothesis was also supported by literature in the way that the literature tells us there are negative consequences of misusing substances in addition to its impact on college attendance. Substance use has been associated with poor academic performance, teen pregnancy, sexually transmitted diseases, job instability, and crime (Barnett et al., 2013). While the relationship between substance use and college attendance was found to be significant in this study, it should be noted that the majority (over 95%) of the students in the sample did attend college.

The results of this study supported Braxton's (2000) model of college choice, specifically how a student's background and school experiences, which could include substance use, may impact a student decision to attend college. Bergerson (2009), Chapman (1981), and Hossler and Gallagher (1987) also identified a student's background as having a significant impact on their postsecondary education choices. One area of this study that did not align with the literature was a student's academic achievement as a predictor of college choice and attendance (Hossler et al., 1999). A preliminary analysis was ran to identify control variables for the study and grades students received in high school was not found to be significant.

Patrick, Schulenberg, and O'Malley (2016) conducted a study focused on predictors of college attendance, completion, and dropout. One of the predictors they focused on was high school substances use. The results of this study aligned with parts of the study Patrick et al. conducted. Both studies found that high school students (Patrick et al.'s study only included high school seniors) that engaged in substance use with cigarettes and illegal drugs had lower odds of attending college. However, Patrick et al.'s study did not find marijuana use and binge

drinking to impact college attendance where this study did. It should be noted that the results of this study did not separate out the type of substance used when looking at the college attendance rates.

Type of College Attended and Substance Use

The third research question of this study focused on understanding if there were statistically significant relationships in the type of college attended (i.e., trade school/community college or four-year college/university) among students who engaged in routine substance use in high school compared to students who did not engage in routine substance use in high school. The study found there was a statistically significant relationship between substance use and type of college attended when controlling for gender as well as when controlling for state (Table 5; Table 6). This infers that a student's substance use in high school can impact his or her college experience by influencing what type of college they attend. There are different degrees and types of degrees awarded at a trade school or community college than at a four-year college or university which can impact a student's career path and opportunities for future education beyond their first degree. The type of degree a student has can also influence the jobs that they will be eligible to apply for after graduation as different jobs require different degrees and the pay may be dependent upon the degree a candidate has. Further, the type of college a student attends may impact the campus resources available, involvement opportunities with clubs and organizations, and other extracurricular activities such as athletics or arts programs.

The results of this study showed that in general, a higher percentage of the students that did not use substances in high school attended a four-year college or university than a trade school or community college. The study also found that students that routinely used substance attended a trade school or community college at a higher rate at their peers that had not used

substances. These findings supported the hypothesis that attendance rates at a four-year college or university will be significantly higher for students who did not engage in routine substance use in high school compared to a trade school or community college and attendance rates at a trade school or community college will be higher for students who did engage in routine substance use in high school compared to a four-year college or university. It is not surprising that students that have routinely used substances are more likely to attend a trade school or community college. Often times the admissions requirements (if there are any) are lesser at a trade school or community college compared to what the requirements are at a four-year college or university. Community colleges that serve as open-access institutions typically have minimal standards for admissions requirements often only requiring a high school diploma or general education diploma (GED) (Bahr, 2013). Knowing that substance use and misuse can have negative impacts on high school students it can be inferred that they may not have the grades or involvement needed to get into some four-year colleges or universities. Often times if a student decides to attend a trade school or community college they do not have to apply as early as he or she would at a four-year college or university so if they had put off thinking about college because of their substance misuse it would be easier for them to apply to a trade school or community college if they made their decision to attend college late in their senior year or after. These results could be misinterpreted to say that trade schools and community colleges are only for or full of students that have and are misusing substances but it should interpreted to show the importance of colleges having resources available to students on campuses so they can be successful. It should also be noted that while students that routinely used substances attended a trade school or community college at a higher rate than their peers that had not used substances, over 46% of them did attend a four-year college or university.

While there was not literature available on how substance use specifically may influence the type of colleges that students attend, the results of this study in relation to substance use and types of college attended again supported that a student's background may influence their college plans. Chapman (1981), Hossler and Gallagher (1987), and Braxton (2000) identified a student's background, which could include his or her substance use, as a key piece to a student's decision to attend college in their college choice models so a student's background is also likely to influence the type of college they choose to attend. Other factors that may influence their college attendance can include peers, academic performance, and experiences in high school (Hossler et al., 1999). Another key factor in a student's college choice may also be whether or not they have the right program for the career goals the student has (Hood, 1968) which was unable to be analyzed in this study. The literature also shares that the availability of colleges or universities in the area a student grows up in may also have an influence on their college choice process (Tinto 1973) which was also unable to be analyzed. Tinto (1975) found that the local availability of a public junior college can alter patterns of college attendance by substituting attendance locally rather than going elsewhere so this may also be a factor in why this study controlled for state as availability may look different in Iowa and Pennsylvania.

Suggestions for Practice

Research by Kirst, Borland, and Chaiton (2014), as well as Schulenberg and Maggs (2002), has shown that young adulthood is a time of increased substance use. With this in mind, it is important to recognize the impact that high school and college educators can have on a student's decision to attend college. In addition, providing educational opportunities for young people to learn about substance abuse may delay the start of substance use in them as well as

prevent later problems caused by substance use (Milam et al., 2016). This could include substance use prevention and intervention.

Suggestions for Substance Use Prevention Professionals

Results from this study show that substance use in high school students can have an effect on their future plans. Some may even say that routinely using substances can impact the quality of their life in the future as going to college is often seen as a way to gain a higher-paying career or move up in socioeconomic status. The information from this study reinforces the idea that there should be substance use prevention and intervention in adolescents. The more knowledge adolescents can gain from prevention and intervention programs the better prepared they will be to make decisions about whether or not they want to use substances in their future. Professionals working in substance use prevention and intervention should encourage collaboration of their services with local communities and schools to reach a wide range of adolescents. They should reach out to local middle schools and high schools to encourage schools to incorporate some of their prevention programming into the school's curriculum or extra services. They should also reach out to churches, libraries, and any other place that you could find families in the community so they could provide prevention programming to families as well. By implementing more substance use prevention and intervention in adolescents, professionals working in this field may be able to impact the college attendance rates of the communities and schools they work in.

Suggestions for High School Educators

High school educators have the opportunity to impact both the use of substances in their high school students as well as the college attendance rates of those high school students that have used substances. In order to impact the use of substances in high school students, high

school educators should continue education on substance use in high school. A required class as part of the curriculum would ensure that all students are receiving accurate and informed information about the consequences of using substances, both short term and long term. Creating an environment in that classroom where students can ask questions without judgement and partake in interactive styles of learning may better enhance the knowledge retained by students. Additionally, high school educators could work to implement some alcohol alternative programming efforts to encourage students to participate in activities that would discourage substance use.

High school educators can also help increase college attendance rates for high school students that have routinely used substances by serving as resources for them. High school educators can have a large influence on students through their knowledge on the topics of selecting a college, applying to college, and ways to finance college. It may be beneficial to have a required workshop or preparation class for high school juniors and seniors where information is shared about college so that students that may not have otherwise thought of attending college can learn of all the opportunities. If high school educators are aware that students that have routinely used substances in high school are less likely to attend college as presented in this study, they can also target these individuals and provide extra guidance and information on attending college. They may be able to target these individuals if they have received reports from colleagues or students about students using substances or through any behavioral reports the school has received on students caught using substances.

Suggestions for Higher Education Professionals

Higher education professionals at both trade schools/community colleges and four-year colleges/universities can assist students that have routinely used substances in high school by

encouraging them to attend college through student recruitment and by helping those students that do attend college to transition better to campus. A better transition to college may include being integrated and socializing with peers, having easy access to campus resources, and getting involved in organizations on campus. If students have more access to or are able to learn more about colleges through college recruitment representatives or admissions counselors, they may have more information and be better equipped to apply to college. They also may become more aware of the different types of colleges they can attend as well as the local colleges around them. Higher education professionals can create this presence and be more available to students to ask questions and gain information about college by partnering with high school educators to visit the schools as well as participate in community college fairs.

Trade schools and community colleges.

If higher education professionals at trade schools and community colleges are more aware that there is a population of students that may be coming to college after routinely using substances in high school, then they may be able to enable a better transition to college for those students. While there is really no way for these professionals to identify students in this subpopulation on campus, there are still ways they can assist them. Students should be required to learn about how using substances in college can affect their college experience and the risks involved. This could be done by incorporating it into the first year experience course or by providing a mandatory online training that has to be completed by students before they begin on campus their first year. Higher education professionals at trade schools and community colleges should make students very aware of all the relevant services and resources on campus. Specifically for this subpopulation of students the college may consider offering alcohol alternative activities, continuous substance use prevention efforts across campus, resources for

students to learn about the effects of substance use, and access to the counseling center for those students that are seriously struggling with substance use and other problems. Some trade schools and community colleges may need to consider offering more campus resources like a counseling center or health center if they do not currently have one or they may need to consider adding more staff the resources they offer so all students needs can be met.

Four-year colleges and universities.

Similar to at the trade school and community colleges, higher education professionals at four-year colleges and universities should also make sure students are educated about substance use and misuse when arriving at college. They should also make campus resources like alcohol alternative activities, the counseling center, and the health center readily available and known to students. Higher education professionals at four-year colleges and universities should also work to promote transfer programs in conjunction with the community colleges in their area. By creating a good partnership with the community colleges and making transfer programs well known to the students, professionals at four-year colleges and universities can offer even more educational opportunities for students that have started at a community college depending upon what that students' educational goals are.

Limitations

One limitation of this study is the demographics of the populations studied. The majority of students in this study were White. With the majority in this study being White, its applicability will not be useful for high minority population. The students also came from rural areas with populations ranging from 6,975 to 44,510 based on the 2000 Census due to the perimeters of the original study conducted by the Partnerships in Prevention Science Institute at Iowa State University. This makes the results not generalizable to cities and areas with

populations over 45,000. Students in this study were also only from the states of Iowa and Pennsylvania. The specific demographic of the population used in this study make the results generalizable for similar regions of the country, and not as generalizable in areas that do not resemble the demographic characteristics.

While this study focused on how a student's substance use was related to college attendance, there are many other factors that influence a student's decision to attend college and the type of college they choose to attend. Two key factors that were not able to be evaluated were a student's socioeconomic status and their parent's educational history. Another limitation of this study is that not all of the factors that students were considering when making their college choice were able to be evaluated. With the use of archival data there was no information on the student's socioeconomic status, parental education, the influence of cost or college location on their choice.

The archival data utilized in this study was from a self-reported questionnaire. This is a limitation as there was no way to verify if the information provided was correctly reported. The college attendance rate in this study was very high which could have been because the data was self-reported by high school students and 19 year olds.

Lastly, there were two limitations with the choice of analysis selected. For this study cross-tabulation with the Chi square and Cochran's and Mantel-Haenszel statistics was used to answer the three research questions. Two variables (i.e., gender and geographic location) were identified as significant and were controlled for in the analyses. However, a limitation of the statistical software used in analysis (i.e., SPSS) was that you cannot control for two variables at the same time in the Crosstabs procedure. Thus, two separate tables had to be included to answer research questions 2 and 3. Another limitation of SPSS is that the dependent variable could only

have two values, not three, in the Crosstabs procedure so for this study the variable of community college and trade or business schools were combined to create one new variable.

Recommendations for Future Research

This study utilized a population with demographics that make it hard to generalize the results to non-rural geographic locations in the United States. One recommendation for future research would be to recruit or utilize more diverse participants, such as race/ethnicity, and urban/suburban locations. Another recommendation would be to consider the types of substances being studied. Future studies should be updated to follow the trends of substances being used by highs school students. Other factors that may influence college attendance that should be considered in future research could include socioeconomic status, parent's education level, the cost of college, and the geographic proximity of a college to the student.

There are several opportunities for future research to build upon this study and its results. A recommendation for future research would be to look past the initial college attendance. The grades students receive in college after deciding to attend college could be assessed in relation to routine substance use in high school. It also may be beneficial to see if student's substance use patterns continue into college or if they evolve and change when a student gets to college. Research could also look at graduation rates from college in relation to routine substance use in high school. Lastly, by looking at a student's job placement or plans for advanced degrees after college graduation, research could fully assess the impact that routinely using substances in high school may have on someone's life.

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APPENDIX A: INSTITUTIONAL REVIEW BOARD APPROVAL

Office of Research Integrity
Institutional Review Board (IRB)
2000 University Avenue
Muncie, IN 47306-0155
Phone: 765-285-5070

DATE:	March 29, 2018
TO:	Raeann Hanlon
FROM:	Ball State University IRB
RE:	IRB protocol # 1214238-1
TITLE:	EXAMINATION OF THE RELATIONSHIP BETWEEN ROUTINE SUBSTANCE USE IN HIGH SCHOOL STUDENTS AND COLLEGE ATTENDANCE
SUBMISSION TYPE:	New Project
ACTION:	APPROVED
DECISION DATE:	March 29, 2018
REVIEW TYPE:	**EXEMPT**

The Institutional Review Board reviewed your protocol on March 29, 2018 and has determined the procedures you have proposed are appropriate for exemption under the federal regulations. As such, there will be no further review of your protocol, and you are cleared to proceed with the procedures outlined in your protocol. As an exempt study, there is no requirement for continuing review. Your protocol will remain on file with the IRB as a matter of record.

Exempt Categories:

	Category 1: Research conducted in established or commonly accepted educational settings, involving normal educations practices, such as (I) research on regular and special education instructional strategies, or (II) research on the effectiveness of or the comparison among instructional techniques, curricula, or classroom management methods.
	Category 2: Research involving the use of educational test (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior
	Category 3: Research involving the use of educational test (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior that is not exempt under category 2, if: (I) the human subjects are elected or appointed officials or candidates for public office; or (II) Federal statute(s) require(s) without exception that the confidentiality of the personally identifiable information will be maintained throughout the research and thereafter.
XXXXX	**Category 4:** Research involving the collection of study of existing data, documents, records, pathological specimens, or diagnostic specimens, if these sources are publicly available or

	if the information is recorded by the investigator in such a manner that subjects cannot be identified, directly or through identifiers linked to the subjects.
	Category 5: Research and demonstration projects which are conducted by or subject to the approval of Department or agency heads, and which are designed to study, evaluate or otherwise examine: (i) public benefit or service programs; (ii) procedures for obtaining benefits or services under those programs; (iii) possible changes in methods or levels of payment for benefits or services under these programs.
	Category 6: Taste and food quality evaluation and consumer acceptance studies, (i) if wholesome foods without additives are consumed or (ii) if a food is consumed which contains a food ingredient at or below the level and for a use found to be safe, by the Food and Drug Administration or approved by the Environmental Protection Agency or the Food Safety and Inspection Service of the U.S. Department of Agriculture.

Editorial Notes:

1. None.

While your project does not require continuing review, it is the responsibility of the P.I. (and, if applicable, faculty supervisor) to inform the IRB if the procedures presented in this protocol are to be modified or if problems related to human research participants arise in connection with this project. **Any procedural modifications must be evaluated by the IRB before being implemented, as some modifications may change the review status of this project.** Please contact (ORI Staff) if you are unsure whether your proposed modification requires review or have any questions. Proposed modifications should be addressed in writing and submitted electronically to the IRB (http://www.bsu.edu/irb) for review. Please reference the above IRB protocol number in any communication to the IRB regarding this project.

Reminder: Even though your study is exempt from the relevant federal regulations of the Common Rule (45 CFR 46, subpart A), you and your research team are not exempt from ethical research practices and should therefore employ all protections for your participants and their data which are appropriate to your project.

D. Clark Dickin, PhD/Chair
Institutional Review Board

Christopher Mangelli, JD, MS, MEd, CIP/
Director
Office of Research Integrity

APPENDIX B: TABLES

Table 1

College Attendance by Gender by Substance Use in High School

	No Substance Use	Routine Substance Use	Total
Female	N=226 42.6%	N=304 57.3%	N=530 100%
Did Not Attend College	1 0.4%	6 2.0%	7 1.3%
Attended College	225 99.6%	298 98.0%	523 98.7%
Male	N=184 45.5%	N=220 54.4%	N=404 100%
Did Not Attend College	1 0.5%	7 3.2%	8 2.0%
Attended College	183 99.5%	213 96.8%	396 98.0%

Table 2

College Attendance by State by Substance Use in High School

	No Substance Use	Routine Substance Use	Total
Pennsylvania	N=161 36.6%	N=279 63.4%	N=440 100%
Did Not Attend College	1 0.6%	6 2.2%	7 1.6%
Attended College	160 99.4%	273 97.8%	433 98.4%
Iowa	N=252 50.6%	N=246 49.4%	N=498 100%
Did Not Attend College	1 0.4%	7 2.8%	8 1.6%
Attended College	251 99.6%	239 97.2%	490 98.4%

Table 3

College Attendance by Substance Use in High School (Controlling for Gender)

	No Substance Use	Routine Substance Use	Total	X^2 (df=1)
Any Year in High School	N=410	N=524	N=934	
Did Not Attend College	2 0.5%	13 2.5%	15 1.6%	5.78*
Attended College	408 99.5%	511 97.5%	919 98.4%	
Cochran's Chi-squared=5.90* (df=1). Mantel-Haenszel Chi-squared=4.68* (df=1).				
Freshman Year	N=1144	N=394	N=1538	
Did Not Attend College	36 3.1%	25 6.3%	61 4.0%	7.87**
Attended College	1108 96.9%	369 93.7%	1477 96.0%	
Cochran's Chi-squared=8.80** (df=1). Mantel-Haenszel Chi-squared=7.92** (df=1).				
Sophomore Year	N=983	N=431	N=1414	
Did Not Attend College	22 2.2%	25 5.8%	47 3.3%	11.83**
Attended College	961 97.8%	406 94.2%	1367 96.7%	
Cochran's Chi-squared=12.06** (df=1). Mantel-Haenszel Chi-squared=10.94** (df=1).				

(continued)

Table 3 (continued)

College Attendance by Substance Use in High School (Controlling for Gender)

	No Substance Use	Routine Substance Use	Total	X^2 (df=1)
Junior Year	N=792	N=508	N=1300	
Did Not Attend College	10 1.3%	22 4.3%	32 2.5%	12.13***
Attended College	782 98.7%	486 95.7%	1268 97.5%	
Cochran's Chi-squared=12.49*** (df=1). Mantel-Haenszel Chi-squared=11.21** (df=1).				
Senior Year	N=671	N=535	N=1206	
Did Not Attend College	8 1.2%	15 2.8%	23 1.9%	4.13*
Attended College	663 98.8%	520 97.2%	1183 98.1%	
Cochran's Chi-squared=4.13*				

Note: *p < 0.05. **p < 0.01. ***p < 0.001.

Table 4

College Attendance by Substance Use in High School (Controlling for State)

	No Substance Use	Routine Substance Use	Total	X^2 (df=1)
Any Year in High School	N=413	N=525	N=938	
Did Not Attend College	2 0.5%	13 2.5%	15 1.6%	5.83*
Attended College	411 99.5%	512 97.5%	923 98.4%	
Cochran's Chi-squared=5.96* (df=1). Mantel-Haenszel Chi-squared=4.73* (df=1).				
Freshman Year	N=1150	N=397	N=1547	
Did Not Attend College	36 3.1%	25 6.3%	61 3.9%	7.81**
Attended College	1114 96.9%	372 93.7%	1486 96.1%	
Cochran's Chi-squared=8.43** (df=1). Mantel-Haenszel Chi-squared=7.56** (df=1).				
Sophomore Year	N=990	N=434	N=1424	
Did Not Attend College	23 2.3%	25 5.8%	48 3.4%	10.94**
Attended College	967 97.7%	409 94.2%	1376 96.6%	
Cochran's Chi-squared=12.07** (df=1). Mantel-Haenszel Chi-squared=10.96** (df=1).				

(continued)

Table 4 (continued)

College Attendance by Substance Use in High School (Controlling for State)

	No Substance Use	Routine Substance Use	Total	X^2 (df=1)
Junior Year	N=795	N=510	N=1305	
Did Not Attend College	10 1.3%	22 4.3%	32 2.5%	12.13***
Attended College	785 98.7%	488 95.7%	1273 97.5%	

Cochran's Chi-squared=12.26*** (df=1). Mantel-Haenszel Chi-squared=10.99** (df=1).

Notes: *p < 0.05. **p < 0.01. ***p < 0.001.

Table 5

Type of College by Substance Use in High School (Controlling for Gender)

	No Substance Use	Routine Substance Use	Total	X^2 (df=1)
Any Year in High School	N=408	N=511	N=919	
Trade School or Community College	141 34.6%	214 41.9%	355 38.6%	5.13*
Four-Year College or University	267 65.4%	297 58.1%	564 61.4%	
Cochran's Chi-squared=5.11* (df=1). Mantel-Haenszel Chi-squared=4.80* (df=1).				
Freshman Year	N=1108	N=369	N=1477	
Trade School or Community College	442 39.9%	196 53.1%	638 43.2%	19.73***
Four-Year College or University	666 60.1%	173 46.9%	839 56.8%	
Cochran's Chi-squared=19.79*** (df=1). Mantel-Haenszel Chi-squared=19.23*** (df=1).				
Sophomore Year	N=961	N=406	N=1367	
Trade School or Community College	365 38.0%	215 53.0%	580 42.4%	26.20***
Four-Year College or University	596 62.0%	191 47.0%	787 57.6%	
Cochran's Chi-squared=26.21*** (df=1). Mantel-Haenszel Chi-squared=25.56*** (df=1).				

(continued)

Table 5 (continued)

Type of College by Substance Use in High School (Controlling for Gender)

	No Substance Use	Routine Substance Use	Total	X^2 (df=1)
Junior Year	N=782	N=486	N=1268	
Trade School or Community College	292 37.3%	239 49.2%	531 41.9%	17.25***
Four-Year College or University	490 62.7%	247 50.8%	737 58.1%	
Cochran's Chi-squared=17.13*** (df=1). Mantel-Haenszel Chi-squared=16.63*** (df=1).				
Senior Year	N=663	N=520	N=1183	
Trade School or Community College	236 35.6%	235 45.2%	471 39.8%	11.20**
Four-Year College or University	427 64.4%	285 54.8%	712 60.2%	
Cochran's Chi-squared=11.21** (df=1). Mantel-Haenszel Chi-squared=10.80** (df=1).				

Notes: *p < 0.05. **p < 0.01. ***p < 0.001.

Table 6

Type of College by Substance Use in High School (Controlling for State)

	No Substance Use	Routine Substance Use	Total	X^2 (df=1)
Any Year in High School	N=411	N=512	N=923	
Trade School or Community College	142 34.5%	214 41.8%	356 38.6%	5.05*
Four-Year College or University	269 65.5%	298 58.2%	567 61.4%	
Cochran's Chi-squared=9.90** (df=1). Mantel-Haenszel Chi-squared=9.44** (df=1).				
Freshman Year	N=1114	N=372	N=1486	
Trade School or Community College	444 39.9%	197 53.0%	641 43.1%	19.51***
Four-Year College or University	670 60.1%	175 47.0%	845 56.9%	
Cochran's Chi-squared=23.20*** (df=1). Mantel-Haenszel Chi-squared=22.58*** (df=1).				
Sophomore Year	N=967	N=409	N=1376	
Trade School or Community College	367 38.0%	217 53.1%	584 42.4%	26.84***
Four-Year College or University	600 62.0%	192 46.9%	792 57.6%	
Cochran's Chi-squared=32.64*** (df=1). Mantel-Haenszel Chi-squared=31.90*** (df=1).				

(continued)

Table 6 (continued)

Type of College by Substance Use in High School (Controlling for State)

	No Substance Use	Routine Substance Use	Total	X^2 (df=1)
Junior Year	N=785	N=488	N=1273	
Trade School or Community College	293 37.3%	240 49.2%	533 41.9%	17.38***
Four-Year College or University	492 62.7%	248 50.8%	740 58.1%	
Cochran's Chi-squared=20.65*** (df=1). Mantel-Haenszel Chi-squared=20.08*** (df=1).				
Senior Year	N=668	N=521	N=1189	
Trade School or Community College	237 35.5%	235 45.1%	472 39.7%	11.33**
Four-Year College or University	431 64.5%	286 54.9%	717 60.3%	
Cochran's Chi-squared=16.76*** (df=1). Mantel-Haenszel Chi-squared=16.23*** (df=1).				

Notes: *p < 0.05. **p < 0.01. ***p < 0.001.